CHAPTER 7

SEAT SURVIVAL KIT

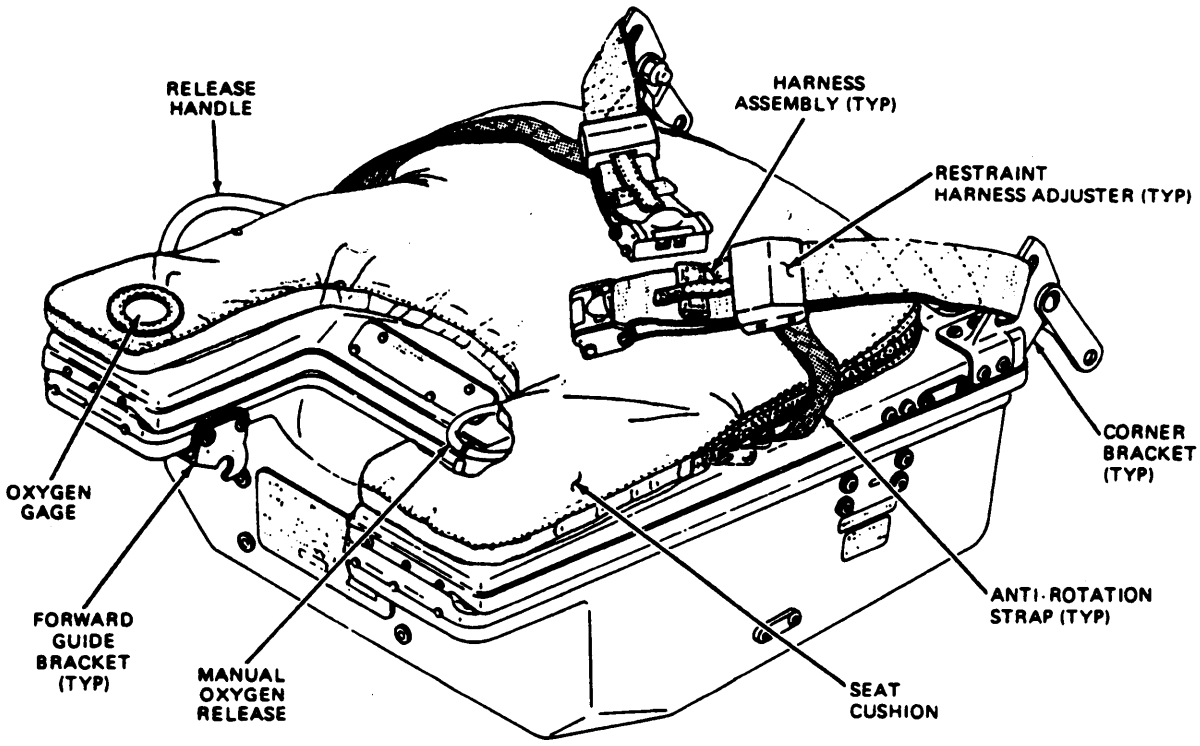
Learning Objective: Upon completion of this chapter, you will be able to identify, inspect, and maintain the RSSK-8 seat survival kit.

The ejection seat survival kit is designed for use in ejection seat equipped aircraft only. Ejection seat survival kits are designated Rigid Seat Survival Kit (RSSKs) -1, -1A, -3, -6B2, -7, -8, and -9; Survival Kit Unit (SKUs) -2A, -3A, and 4A; and Semirigid Restraint and Life Support Assembly (IULSA) -1. The RSSK-8 is discussed in this chapter.

RSSK-8 SERIES SEAT SURVIVAL KIT

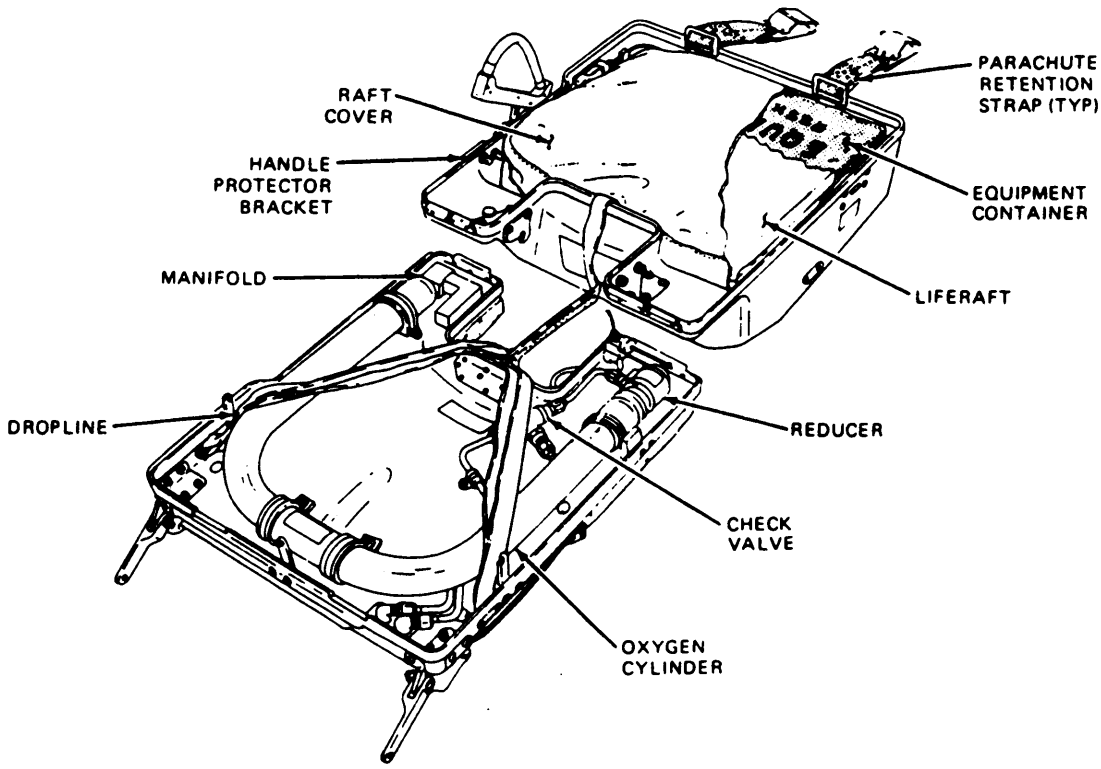
The Rigid Seat Survival Kit-8 Series (RSSK-8 series) is designed for use with Douglas ESCAPAC ejection seats and functions as a seat cushion for the aircrewman as well as a container for an emergency oxygen system, life raft and survival equipment (shown in figures 7-1 and 7-2). There are three manufacturers of these kits—Rocket Jet Engineering Corp., Scott Aviation Corp., and East-West Industries. The illustrations in this chapter show the latest configuration of the RSSK-8 manufactured by Scott Aviation Corporation.

The RSSK-8 has a bonded fiber glass body and an extruded metal lip interconnecting the upper and lower containers. The upper container houses



239.553

Figure 7-1.—RSSK-8 closed.



239.554

Figure 7-2.—RSSK-8 open.

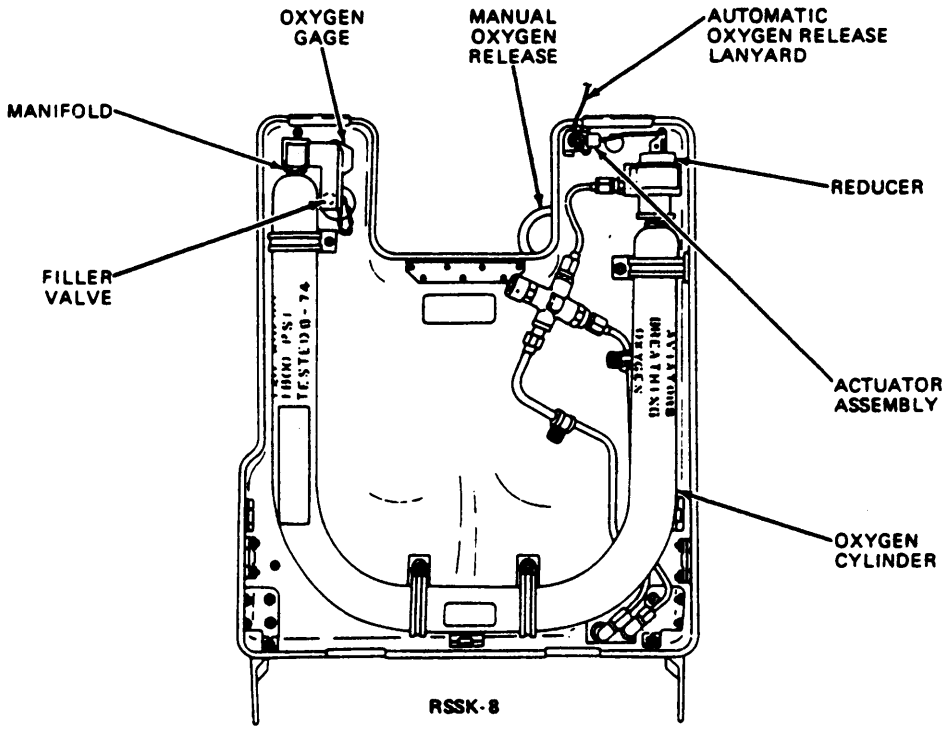
the emergency oxygen supply; the lower container, the life raft and survival equipment. The kit is opened by the yellow handle mounted on the forward right side. Two adjustable retaining straps, permanently mounted on the upper container, provide attachment of the kit to the aircrewman's torso harness. A flexible oxygen and communications hose installed on the aft left side of the upper container connects the aircrewman to the aircraft for communications and oxygen functions. In the event of a failure of the aircraft oxygen system, emergency oxygen is available by pulling the manual oxygen release on the kit. Oxygen from the kit then flows to the aircrewman through the emergency oxygen system reducer in the kit. A check valve in the oxygen line prevents emergency oxygen from flowing into the aircraft system or overboard from the kit. When the aircrewman ejects, the reducer is automatically operated by a lanyard connected between the actuator and aircraft.

When he sits in the aircraft, the aircrewman connects the kit quick-release fittings to his retaining straps on his torso harness. He also connects his oxygen mask and communication hose to the seat pan quick-disconnect fitting. This hose can be quickly disconnected by pulling sharply on the hose assembly.

The RSSK-8 is a part of the survival equipment used by aircrewman aboard the types of aircraft listed in table 7-1. As you can see,

Table 7-1.—RSSK-8 Application

Escape System	IC-2	IC-3	IF-3	IG-2	IG-3	IE-1
Aircraft	A-7A	A-4F	A-4F	A-7A	A-4F	S-3A
	A-7B	A-4M EA-4F	A-4M	A-7B	A-4M	(See Note)
	A-7C	TA-4F	TA-4F	A-7C	TA-4F	
	A-7E	TA-4J	TA-4J	A-7E	TA-4J	
	A-7H			A-7H		
NOTE: Survival kits used in S-3A Type A/C must be updated to provide compatibility with AIC-14 Intercommunication Systems and the Integrated Communication Control System.						



239.555

Figure 7-3.—Emergency oxygen schematic.

these are high-performance aircraft that can operate at high altitudes. Therefore, in addition to containing survival gear, the kit also furnishes oxygen to the aviator when he ejects at altitudes where there is not enough oxygen to maintain consciousness.

When the aircrewman ejects from the aircraft, the following events occur:

The automatic actuation lanyard for the emergency oxygen system actuates the reducer assembly at seat ejection. The aircrewman is then supplied emergency oxygen for descent (fig. 7-3). If automatic actuation of the emergency oxygen system fails, the emergency oxygen system may be actuated by the aircrewman by means of the manual oxygen release (green ring). The radio beacon is automatically actuated by another actuation lanyard. The beacon provides a continuous signal during descent.

When a safe altitude is reached, the aircrewman pulls the kit release handle free of the kit. This unlocks the containers and the lower half falls away but remains attached by the dropline assembly. The life raft, attached to the dropline, is automatically inflated.

INSPECTIONS

Your concern with this unit is mainly in inspecting it at scheduled intervals or when damage might be suspected. There are three types of inspections made at routine intervals: the turnaround/daily/preflight/postflight/transfer, special inspections, and the more detailed acceptance/phased/SDLM inspections. In addition, conditional inspections are unscheduled inspections required as the result of a specific situation or set of conditions; for example, hard-landing inspections or any inspection directed by higher authority that is not ordered in a technical directive.

The turnaround/daily/preflight/postflight or transfer inspections consist of a visual-type inspection performed in conjunction with the aircraft inspection requirements for the aircraft in which the survival kit is installed. These inspections are performed by line personnel (plane captain) or delegated aircrewman who have been instructed and found qualified by the aviator's equipment branch.

The special (7/14 day, etc.) inspections are performed on inservice survival kits installed in

aircraft or in ready room issue. These inspections are done at the organizational level of maintenance by personnel assigned to the aviator's equipment branch. The date of these inspections and inspector's signature are recorded in the inspection section of the Aviation Crew Systems History Card.

To perform the turnaround/daily/preflight/postflight/transfer or special inspections, visually inspect the following:

1. Cushion for secure attachment, rips, tears, and loose or grayed stitching.
2. Release handle for proper seating and corrosion.
3. Oxygen gauge for FULL indication.
4. Emergency oxygen lanyard coupling assembly for spring security.
5. Emergency oxygen lanyard for proper installation and corrosion.
6. Manual emergency oxygen release for condition and security of attachment.
7. Container assembly for cracks, breaks, and other obvious damage.
8. Harness assemblies for loose or frayed webbing, stitching, and cracked or broken hardware.
9. Lapbelt release assembly for loose or missing screws and corrosion.
10. Beacon actuator indicator for bent shaft, hairpin cotter for elongation and corrosion.
11. Secure attachment of beacon automatic actuation lanyard (if installed).
12. Seal decal for secure attachment, tears, or rips. If the seal decal is damaged, the RSSK must be reclosed by IMA.
13. Condition of oxygen hose and secure attachment to kit. If repair procedure has been performed on the oxygen hose assembly, check external wiring for secure attachment.
14. For the S-3A aircraft, secure attachment of externally mounted electrical cable assembly to oxygen hose assembly.

If any parts must be replaced, note that similar parts from kits made by different manufacturers are not interchangeable. Attempts to substitute one manufacturer's part for another may cause the kit to malfunction. Make sure the parts and assembly lists are for the proper kit when servicing a kit, or ordering replacement components for it.

If discrepancies are found or suspected, maintenance control must be notified.

Survival kit assemblies that do not pass inspection and cannot be repaired in the aircraft must be removed and replaced by Ready for Issue (RFI) survival kits. Non-RFI survival kits are forwarded to the nearest maintenance activity having repair capability.

ACCEPTANCE/PHASED/SDLM INSPECTIONS

The acceptance inspection is performed when the survival kit is placed into service. When a survival kit is an aircraft inventory item, the acceptance inventory inspection and packing serves as the acceptance inspection. In this case, the records concerning the RSSK must be examined. Phased/SDLM inspection cycle of a survival kit corresponds to the aircraft phased/SDLM maintenance inspection cycle as scheduled by the Planned Maintenance System. In no case should the phased interval exceed 225 days.

Visual Inspection

This inspection will be performed prior to the functional check of the kit. Visually check the kit for the following:

1. The cushion for rips, tears, and general condition.
2. The release handle for wear, corrosion, and damage.
3. The manual emergency oxygen release handle (green ring) for damage and security of attachment.
4. The upper and lower container for cracks, corrosion, and security of hardware.
5. Webbing for loose or frayed stitching and security of attachment.
6. The lapbelt release assembly for loose or missing screws and corrosion.
7. Swaged balls on cable assemblies for security of attachment. The swaged ball pull test is performed during the acceptance inspection only.

Swaged Ball Pull Test

To check the swaged ball attachment to cable assemblies, you will need a nylon cord, Type II scale (at least 100-pound capacity). Perform the pull test as follows:

1. Remove four screws and cover from assembly.
2. Push actuating lever down (fig. 7-4).

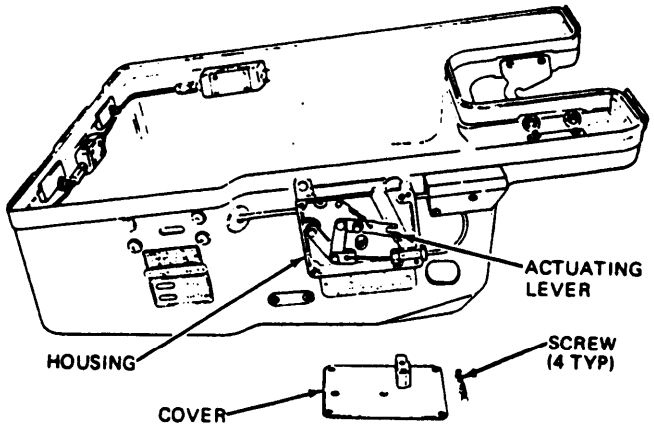


Figure 7-4.—Pushing actuating lever down.

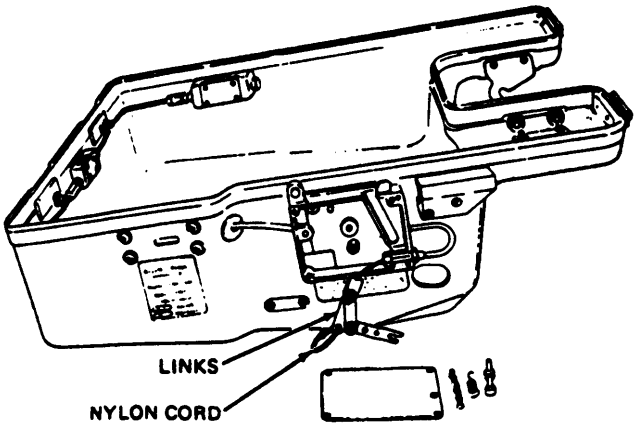


Figure 7-6.—Tying links together.

3. Remove spring and two spacer pins. Lift actuating lever assembly with cable inserted in clevis from housing (fig. 7-5).

4. Thread approximately 5 inches of nylon cord, MIL-C-5040, through "LINKS" and tie both ends together (fig. 7-6).

5. Insert hook of scale into loop of nylon cord (fig. 7-7).

6. Pull the scale towards aft direction of kit and in the normal direction of cable operation. Ensure the adjusting sleeve does not move from its housing while pull force is exerted. Ensure that the links and clevis are not pulled from the housing more than 1/2 inch. Swaged balls should withstand 100 pounds pull force (fig. 7-8).

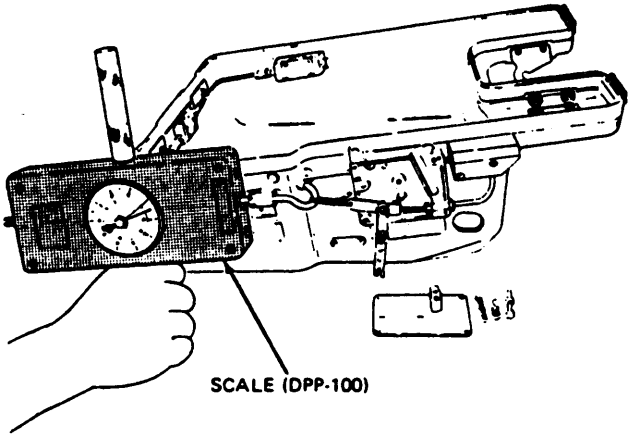


Figure 7-7.—Attaching scale to nylon loop.

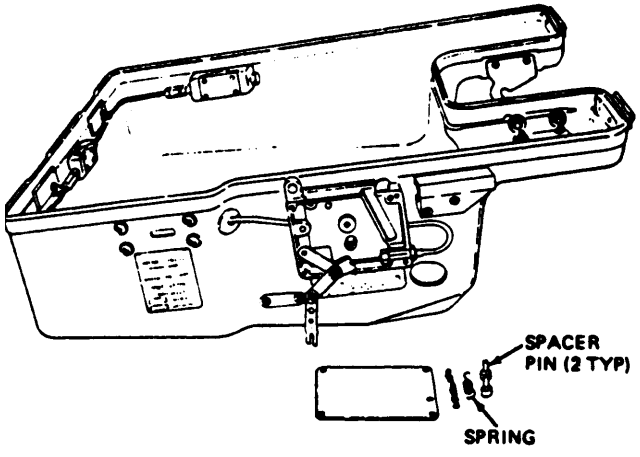


Figure 7-5.—Removing spring and spacer pins.

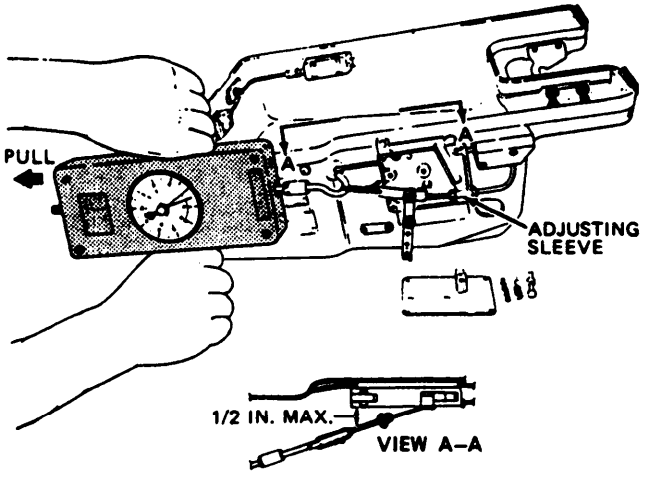


Figure 7-8.—Testing swaged ball.

Table 7-2.—Troubleshooting

Trouble	Probable Cause	Remedy
Low or zero pressure indication on oxygen gage.	Oxygen tube empty.	Recharge oxygen system.
	Defective pressure gage.	Replace gage.
	Oxygen system components are leaking.	Tighten connections or replace defective parts as required.
No oxygen flow at kit-to-man hose from aircraft system (emergency oxygen system not actuated).	Defective check valve.	Replace check valve.
Oxygen pressure at kit-to-man hose not within tolerance of 45 to 80 psi when emergency oxygen system actuated during test.	Defective oxygen reducer/manifold.	Replace oxygen reducer/manifold.
	Oxygen reducer/manifold incorrectly adjusted.	Adjust and test reducer/manifold.
Relief Valve Leakage.	Defective Quad-Ring.	Disassemble, remove and replace Quad-Ring P/N 4008 (FSCM 07322).
Relief Valve does not operate within tolerance of 120 to 140 psi when simulated aircraft back pressure is applied during test.	Defective or out of adjustment relief valve.	Adjust relief valve in accordance with NAVAIR 13-1-6.3. If specification cannot be met replace relief valve.
Oxygen flow exists at ship-to-kit hose when emergency oxygen system is actuated during test.	Defective check valve.	Replace check valve.
No oxygen flow at kit-to-man hose when emergency oxygen system is actuated by emergency oxygen lanyard or emergency manual oxygen release.	Upper and lower adjuster or oxygen actuator assembly not adjusted correctly: Oxygen lanyard or manual release pulls free of actuator assembly before reducer/manifold toggle arm is operated by actuator cables.	Adjust oxygen actuator assembly.
Pull force to actuate emergency oxygen system by emergency oxygen lanyard or emergency manual oxygen release is not within tolerance of 10 to 30 pounds.	Excessive or insufficient washers beneath toggle arm of reducer/manifold assembly.	Adjust and test reducer/manifold.
	Foreign matter in actuator.	Clean actuator assembly.
	Expanded diameter of retaining ring on emergency manual oxygen release causing an increased retention load within adjuster of oxygen actuator assembly.	Replace oxygen actuator assembly.
	Burrs and corrosion on grip assembly and adjuster nut.	Polish off burrs and corrosion and lubricate.
Emergency lanyard coupling assembly loose.	Broken or missing spring.	Repair in accordance with NAVAIR 13-1-6.3.
Operation of handle fails to separate upper from lower container.	Lock actuating cables out of adjustment.	Adjust cables.
	Broken, crushed or bent lock actuating cable assembly.	Replace discrepant cable.
	Damaged lock.	Replace discrepant lock.
	Pin opposite slot on disk in multi-release assembly has sheared (Rocket Jet only).	Replace multi-release assembly.
	Swaged ball slipped off cable.	Install new swaged ball on cable.
Handle does not release from kit within tolerance of 10 to 30 pounds.	Latch in handle not clearing latch engagement projection on multi-release housing during handle operation.	Adjust position of latch on guide.
	Broken, crushed or bent lock actuating cable assembly.	Replace discrepant cable.
	Damaged lock.	Replace discrepant lock.
Loss of aircraft communications.	Broken or misaligned pins and sockets in hose connectors. Open or short circuit in oxygen hose wiring.	Perform electrical check.

7. If the assembly fails to meet the specified pull force, slide the ball off the cable and swage a new ball in the same direction.

8. Assemble the parts and install the cover on the housing.

Functional Check

This check will be performed at each acceptance/phased/SDLM inspection. It will also be performed after any adjustment procedures. Refer to Troubleshooting Chart (table 7-2) prior to making any adjustments.

Materials required to perform the functional check include test stand 59A120 (test stand 59A120 is covered in detail in chapter 11 of this manual), scale (0 to 50 pounds), leak detection compound, and a toggle reset tool.

Inspect leak detection compound before using it. Compound that is not clear and free from suspended material or sediment is considered contaminated and must be disposed of. Compound exhibiting peculiar odors such as acetone or alcohol is considered contaminated and must be disposed of.

Emergency oxygen cylinder pressures used in this functional test are taken under ideal shop conditions of 70°F or 21°C. Variances in air temperatures directly affect charging pressures. Refer to table 7-3 for details.

Ensure that the emergency oxygen cylinder is filled to 1,800 to 2,000 psi corrected pressure.

1. Connect the oxygen outlet hose of the kit to the bell jar coupling C-1 on the test stand, and ensure that valve V-2 is open and all other test stand valves are closed.

2. Attach the pull scale to the manual emergency oxygen release handle, and test for disengagement force. Ensure the manual oxygen release is of the separating type before attempting to disengage it.

3. Measure the force required to disengage the manual oxygen release. This should be 10 to 30 pounds, and the emergency oxygen system should actuate and indicate 45 to 80 psi on gauge PG-1 on the test stand.

4. Reinstall the manual oxygen release (if separating type) and reset the reducer.

5. Turn the oxygen supply cylinder to the test stand on.

6. Slowly open valve V-6 on the test stand and adjust the pressure on gauge PG-1 to 90 psi.

Table 7-3.—Amb~nt Air Temperature vs Charging Pressures

Ambient Air Temperature		Charging Pressure
°F	°C	PSI
0	-18	1550-1750
10	-12	1600-1775
20	- 7	1625-1800
30	- 1	1675-1850
40	5	1700-1875
50	10	1725-1925
60	16	1775-1975
70	21	1800-2000
80	27	1825-2050
90	32	1875-2075
100	38	1900-2125
110	43	1925-2150
120	49	1975-22(X)
130	54	2000-2225

7. Measure the force required to disengage the manual oxygen release with a scale. This force should be 10 to 30 pounds.

8. Using leak test compound, check all pressure lines and fittings on the kit for leakage. No leakage is allowed.

9. Reinstall the manual oxygen release (if separating type) and reset the reducer.

10. Using valve V-6, increase pressure until the relief valve unseats. However, do not increase the pressure above 150 psi. Unseating can be determined by listening, and by observing gauge PG-1 on test stand.

11. Repeat step 10 several times to establish a correct pressure. Relief valve will unseat at 120 to 140 psi when pressure is increased, and reset at 110 psi minimum when pressure is decreased. The pressure is reduced below the opening pressure of the relief valve by closing valve V-6 and opening bleed valve V-5. Once reset, the relief valve will be leaktight.

12. Check the relief valve with leak test solution. No leakage is allowed.

13. Close valve V-6 and bleed oxygen pressure from the system by opening valve V-5. All pressure is bled when gauges PG-1 and PG-4 indicate zero pressure.

14. Close valve V-5.

15. Ensure that bleed valve V-2 is opened and all other test stand valves are closed.

16. Measure the force required to disengage the automatic oxygen release with a scale. This force should be 10 to 30 pounds when it disengages; the emergency oxygen system should actuate and indicate 45 to 80 psi on gauge PG-1.

17. Reset the reducer.

18. Open valve V-5 to bleed pressure.

19. When pressure is bled, as indicated by no indication on gauges PG-1 and PG-4, close valve V-5. Now, observe gauge PG-4 for 2 minutes. Any pressure rise indicates leakage in the valve seat of the reducer/manifold.

20. Open valve V-5 and close valve V-2.

21. Disconnect the oxygen hose from fitting C-1.

22. Ensure all valves on the test stand are secured.

23. Connect the oxygen outlet hose to fitting NIP-6. Ensure that valve V-10 is open and all other test stand valves are closed.

24. Connect the test stand hose between fitting NIP-5 and fitting NIP-4.

25. Move valve V-1 to the NIP-4 position.

26. Ensure that 1,800 to 2,000 psi is in the oxygen cylinder of the kit.

27. Pull the manual oxygen release. Slowly open valve V-9 to indicate 90 liters per minute on gauge PG-2. Oxygen pressure should be indicated as 45 to 80 psi on gauge PG-1.

28. Observe emergency oxygen cylinder pressure gauge and allow the system to decrease to 250 psi while maintaining 90 LPM and 45 to 80 psi pressure. When needle of this cylinder pressure gauge is between the E and F of REFILL, pressure is approximately 250 psi.

29. Close valve V-9.

30. With zero flow indicated on gauge PG-2, gauge PG-1 should indicate 45 to 80 psi.

31. Reinstall the manual oxygen release (if separating type) and reset the reducer.

32. Bleed the oxygen pressure from the system by opening valves V-5 and V-2. All pressure is bled when gauges PG-1 and PG-4 indicate zero pressure.

33. Disconnect the kit from the test stand.

34. Secure the test stand.

35. Thoroughly clean all areas wetted with leak test solution with clean water. Dry them with a lint-free cloth, filtered low-pressure compressed air, or by low-pressure nitrogen.

36. Recharge the emergency oxygen cylinder to 1,800 to 2,000 psi.

37. Perform a release handle pull test on the fully packed kit. (Refer to NAVAIR 13-1-6.3 for instructions.)

PURGING AND CHARGING EMERGENCY OXYGEN SYSTEMS

To purge and charge the emergency oxygen cylinder, proceed as follows:

Materials Required

Leak detection compound

Oxygen purging electric heater

Nitrogen, type I, class I, grade A

Aviator's breathing oxygen, type I

Shutoff valve

Pressure regulator

Adapter, filling

1. If the survival kit assembly has not been removed from the aircraft, remove the personnel parachute and survival kit in accordance with the applicable maintenance manual.

2. Remove the oxygen filler valve cap and connect a filling adapter to the filler valve (fig. 7-9). If the emergency oxygen system is

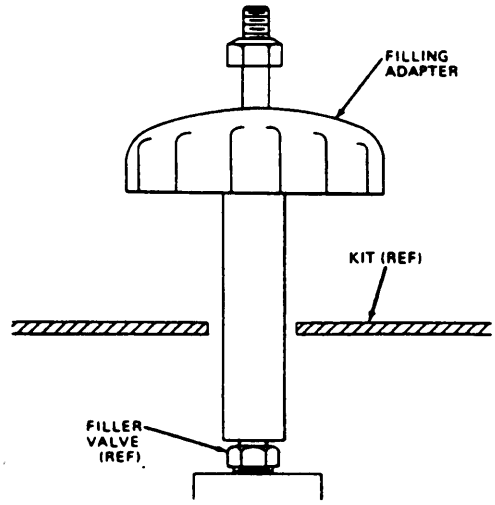


Figure 7-9.—Filling adapter.

contaminated or the cylinder has remained empty for more than 2 hours, purging is required. If an emergency oxygen cylinder does not warrant the purging process, proceed to step 10 for the charging sequence. If it is necessary to release pressure in the oxygen bottle before purging/filling, pull the emergency oxygen lanyard. This releases the pressure through the pressure reducer. DO NOT release pressure through the filler valve or adapter. Releasing high--pressure oxygen through the restriction of the filler valve causes heat, and a fire or an explosion may result.

3. Deplete the emergency oxygen cylinder, if necessary.

4. Connect a nitrogen source to the filling adapter and close the pressure reducer.

5. Slowly pressurize to 100 psi with a nitrogen temperature of 110° to 130°C (230° to 266°F) using an electric heater.

6. Turn off the nitrogen source and deplete the oxygen cylinder.

7. Repeat steps 5 and 6, twice.

8. With the pressure reducer open, turn on the nitrogen source and purge for 10 minutes at a temperature of 110° to 130°C (230° to 266°F).

9. Turn off the nitrogen source and disconnect it.

10. Connect the oxygen source to the filling adapter with a suitable pressure regulator and shutoff valve. Reset the pressure reducer.

11. Slowly pressurize to 100 psi.

12. Deplete the cylinder to 50 psi.

13. Ensure that minimum slack exists in the actuating cables of the reducer/manifold, and that they are tight enough to ensure full engagement of the toggle arm.

14. Charge the emergency oxygen system in stages in accordance with table 7-4 until the pressure gauge indicates correct pressure for existing ambient temperature, as indicated in table 7-3. Carefully observe the scheduled filling stages, since rapid application of oxygen pressure creates heat, which may result in fire or explosion. Allow no less than 3 minutes for each filling stage and 2-minute intervals for cooling between stages. If the kit is to be stored or shipped, fill it to 200 psi (when needle on gauge bisects E of REFILL).

Table 7-4.—Charging Stages

Stage	PSI
1	500
2	1000
3	1500
4	1800
5	2000

15. Loosen the filling adapter until all pressure is bled from the high-pressure line. Remove filling adapter. Visually ensure that the filler valve does not turn as the filling adapter is removed. Serious injury could result.

16. Apply leak test compound around the filler valve, gauge, and reducer. Check for leaks; then wipe connections clean, using a lint-free cloth.

17. Replace the oxygen filler valve cap on the filler valve.

18. If the personnel parachute and survival kit assembly were removed from the aircraft in step 1, reinstall them at this time.

As you know, there are a variety of seat kits available. Although the basic principles of operation are similar, they differ in accordance with the aircraft in which they are issued, their contents, and the type of ejection seat in the aircraft. Additional information concerning updating, modification, inspection, maintenance, etc., of seat survival kits can be obtained from NAVAIR 13-1-6.3. *Aviation Crew Systems Seat Survival Kits.*